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SAREP Technical Series – Volume 2b

Annexes to Volume 2a: A Transboundary Fisheries Management Plan for the Cubango-Okavango River Basin



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SAREP TECHNICAL SERIES – VOLUME 2B

ANNEXES TO VOLUME 2A: A TRANSBOUNDARY FISHERIES MANAGEMENT PLAN FOR THE CUBANGO- OKAVANGO RIVER BASIN

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OKACOM

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CONTENTS

ANNEX 1. LEGISLATIVE AND INSTITUTIONAL FRAMEWORK FOR MANAGEMENT OF THE OKAVANGO DELTA FISHERIES IN BOTSWANA.....	2
LEGISLATIVE FRAMEWORK	2
The Fish Protection Act (Act 42 of 1975)	3
The Fisheries Regulations (2008)	3
Community-Based Natural Resources Management (CBNRM) Policy	3
The Draft Wildlife Policy	4
Code of Conduct for Responsible Fishing in the Okavango Delta.....	4
Okavango Delta Management Plan (ODMP, 2008)	4
INSTITUTIONAL FRAMEWORK.....	5
National Institutions	5
Local Institutions in the Delta	7
International Institutions/Transboundary Initiatives	8
ANNEX 2. SUBMISSION BY KAVANGO OPEN AFRICA ROUTE (KOAR) REGARDING TOURISM CONCERNS ABOUT FISHING ACTIVITIES IN THE OKAVANGO/CUBANGO RIVER SYSTEM	11
ANNEX 3. LEGISLATION TO BE DISCUSSED AS PART OF HARMONIZATION	13
ANNEX 4. ARGUMENTS FOR AND AGAINST HARMONIZED TRANSBOUNDARY CLOSED SEASONS FOR FISHING.....	20
ANNEX 5. LOGICAL FRAMEWORK FOR IMPLEMENTATION OF THE TRANSBOUNDARY FISHERIES MANAGEMENT PLAN.....	22
ANNEX 6. PROPOSED FORMS TO BE USED IN THE IMPLEMENTATION OF RESEARCH AND MONITORING	30

ANNEX 1. LEGISLATIVE AND INSTITUTIONAL FRAMEWORK FOR MANAGEMENT OF THE OKAVANGO DELTA FISHERIES IN BOTSWANA

Shipton's (2011) review of Botswana's legislative and institutional framework is comprehensive and thus it is unnecessary to duplicate the work. It is therefore presented here with the author's permission. Several sections, particularly covering staffing of departments and descriptions of duties have been abbreviated. For details of this background information, refer to the original document (Shipton, 2011).

LEGISLATIVE FRAMEWORK

Although Botswana has developed an impressive array of legislative, policy, and regulatory tools with which to manage the country's natural resources, the fisheries sector has received rather limited attention. Currently, fisheries is legislated under the outdated Fish Protection Act (Act 42 of 1975) and regulated under the Fish Protection Regulations (2008). No fisheries policy has been developed, and thus the biological, economic, and social objectives for the country's fish resources remain undefined. In this regard, it is essential that a policy is formulated to guide development of regulations, governance structures, and management planning processes. Although permitting regulations have been in place since 1998, the fishery essentially remains an open access, common pool resource. In the absence of a set of clearly defined user rights, some stakeholders have been marginalized. Marginalization has manifested itself as losses to property rights, denial of access and *de facto* privatization of the resource, or as conflict. For example, in the southern part of the delta, Mosepele (2006) cites the weak legal framework in wildlife management areas (WMAs) and controlled hunting areas (CHAs) as being problematic as the tourist operators claim exclusive rights to the fish resources within their concessions. The tour operators base their arguments for exclusive access to the resources on the tourism policy (government of Botswana, 1990), which confers *de jure* rights within the concessions (DWNP, 2000), except in situations where citizens have *de facto* rights. In contrast, in the Panhandle, the lack of clearly defined user rights has led to conflict between the recreational fishers and the commercial gill net fishers (Nengu, 1995; Bills, 1996; Ramberg & van der Waal, 1997) who view

themselves as competing for the same resource, blaming one another for restricting access and depletion of the resources.

The following section provides a brief synoptic review of the most important legislation that relates to fisheries governance in the country.

The Fish Protection Act (Act 42 of 1975)

The Fish Protection Act (Act 42 of 1975) provides the overarching legislative framework within which fisheries operate and are managed in the country. Concomitant with many other countries' fisheries legislation, it is geared more toward control than development. The act makes provision for the minister to make regulations, and thus the minister is empowered to set the fishing seasons, licensing and registration conditions, and fee structures, and regulate the trade of fish. Gear types can be controlled and the movement of fish into and within the country's borders regulated. In addition, exemptions to any of the regulations may be granted at the minister's discretion. The act prohibits the use of poisonous or explosive substances in the fishery, and provides powers of entry, seizure, and arrest.

In terms of compliance, the act allows for fines not exceeding P500, or imprisonment for a term not exceeding 12 months, or both. Setting upper limits on fine structures is problematic because inflationary pressures tend to devalue their deterrent effect. The fish regulations of 2008 are restricted by these upper limits and provide little deterrence to offenders.

The Fisheries Regulations (2008)

The Fisheries Regulations (2008) are the first set of regulations that have been developed to regulate fisheries in Botswana. Before to their promulgation, the fisheries were effectively unregulated. The regulations provide the licensing framework. Licenses are required for commercial gill net fishers, recreational fishers, recreational fishing tournament operators, and gill net importers and distributors. Artisanal fishers do not require licenses. The drafting of regulations was the result of a consultative process between the fisher communities, and among other conditions, provide for the prohibition of certain fishing practices (e.g., night fishing, seining, use of mosquito nets), a closed season, restricting fish movements, and collection of catch data. The regulations effectively maintain the fishery as an open access fishery. In terms of licensing, there are no restrictions on the number of entrants into the commercial or recreational fisheries, nor do the regulations explicitly allow for control of effort.

Community-Based Natural Resources Management (CBNRM) Policy

The CBNRM policy aims to actively engage communities in natural resource conservation by providing them with a framework that enables them to earn tangible benefits from sustainable natural resource management. The policy establishes the institutional, regulatory, and participatory framework within which natural user rights can be devolved to communities and provides guidance on CBNRM implementation. Although fisheries are not explicitly mentioned in the policy, the policy provides useful insight into how communities could

access and manage their local resources. In terms of fisheries management, the policy provides for community-based organizations (CBOs) to be provided with rights to control access and enforce exclusion and allows for 15-year community natural resource management leases to be granted to communities, with natural resource user rights being granted to communities within defined lease areas. Although the government would ultimately be responsible for regulating resource use and may set quotas on resource use, it has the responsibility of providing support to communities (e.g., mentoring and extension services). In terms of fisheries management, the policy fosters co-management and would technically enable fisher communities to set up CBOs to manage fish resources in a given area for commercial, artisanal, or recreational purposes.

The Draft Wildlife Policy

The draft wildlife policy is designed to provide the framework for conservation, sustainable resource use, and management of wildlife and biodiversity resources in the country. The policy focuses on generating development benefits for communities and maintaining the country's biodiversity. In terms of the country's wildlife resources, the policy advocates for land uses and categories to be distinguished, defined, and gazetted. In terms of the country's aquatic resources, these are identified as: 1) important fish areas: key habitats for fish that require protection and management; 2) transfrontier conservation areas: for management of natural resources that straddle international boundaries – this would include the wider Okavango River system; and 3) wetland ecosystems: areas with the potential for aquatic species conservation, fishing, aquaculture, and recreation. The policy complements the CBNRM policy in that it advocates development of CBNRM systems and co-management of resources and promotion of economic instruments for nature-based tourism. The policy will be implemented through a participatory, decentralized institutional framework with some responsibilities devolved to the private sector and communities.

Code of Conduct for Responsible Fishing in the Okavango Delta

The code of conduct was developed by the Okavango Fisheries Management Committee (Biokavango Project, 2011a). In many respects, development of the code was a landmark agreement that has reduced conflict between the commercial and recreational fishers and provides a good example of co-management and conflict resolution. The code of conduct consists of 10 actions that have been collectively agreed on to reduce conflicts between fisher groups. The code includes restrictions on fishing in the vicinity of tourist lodges; no-wake zones; rights of way; prohibiting unsociable practices such as littering, camp fires, and the use of alcohol on the water; marking nets; submission of catch returns; and compliance with fisheries regulations of 2008. The code is not legally binding, and thus it is not possible to legally enforce it.

Okavango Delta Management Plan (ODMP, 2008)

The Okavango Delta Management Plan has been developed to promote integrated resource management throughout the delta. The ultimate goal of the plan is sustainable use of the delta's natural resources, aligning interventions with national development goals as articulated through the District Development Plans and National Development Plans as well as Vision 2016. The plan was designed to align sector policies, legislation, and strategies such that the long-term ecological functioning of the delta was ensured.

The plan takes a holistic approach to managing the delta's natural resources; thus although some of the key operational objectives and issues identified in the plan address key fisheries issues, many others are crosscutting. It is important that this management plan considers the objectives of the OMDP and integrates them into the fisheries management planning process. In this regard, the three key fisheries issues, operational objectives, and proposed activities that are identified in the plan and the current outcomes relate to:

1. Need for improved baseline data on fish stocks in the system
2. Manpower capacity of the fisheries division
3. The problem of fisheries conflicts

Other key operational objectives identified in the management plan that are not directly related to the Fisheries Division or fisheries *per se* but are crosscutting include:

1. Management of channel blockages to sustain communities' access to livelihood activities
2. Traditional access rights to natural resources in concession areas
3. Human/wildlife conflicts, reducing the conflict between fishers and crocodiles that currently damage their nets
4. Building the capacity of communities for delivering management and promoting sustainable use of natural resources

INSTITUTIONAL FRAMEWORK

National Institutions

Department of Wildlife and National Parks (DWNP)

The Fisheries Division of the Department of Wildlife and National Parks in the Ministry of Environment, Wildlife and Tourism is the government agency responsible for fisheries management in the country. The division's head office is in Gaborone, with regional offices that have management responsibility for the delta based in Maun and Shakawe.

Maun

The Maun office of the DWNP Fisheries Division is a regional office that is responsible for districts in the northwest of the country. The office has a staff eight: two wildlife biologists, three field assistants, and three senior wildlife scouts. (Modified from report of Shipton based on updated information). The Maun office is responsible for supervising operations at the Shakawe office, collating the fisheries data that are collected from fishers and the monthly fish resource monitoring program.

Shakawe

The Shakawe office of the DWNP Fisheries Division is the local fisheries office responsible for the Okavango District. The office has a staff complement of three based at Shakawe: a wildlife officer and two wildlife scouts. Gumare has one senior wildlife warden and one field assistant, while Seronga has two field assistants. (Modified from report of Shipton based on updated information).

Staff Deployment

Primary tasks undertaken by the department personnel include permitting of fishers, compliance, extension, collecting and collating catch and effort data from the commercial fishers, and fisheries survey and extension work. Since the advent of the 2008 fishing regulations, they have also assumed responsibility for compliance activities in their areas. Shipton (in full report) reports a clear need to review the rationale behind deploying people in the field as both extension and compliance personnel.

Compliance Operations

Currently, undertaking regular compliance operations is problematic for the Fisheries Division because of the poor condition of its boats and engines.

Fisheries Monitoring

The DWNP is the responsible agency of state that is mandated to monitor the fisheries. Fisheries monitoring is currently undertaken at three levels: catch returns, frame surveys, and monthly fish surveys. Creel surveys are supposed to be undertaken monthly; however, these are not being done due to logistical and staffing problems.

Catch Returns

Monitoring catch returns is the primary mechanism with which the DWNP monitors the catch in the delta. In this regard, the Second Schedule of the Fish Protection Regulations (2008) requires all commercial fishers to submit monthly catch records (recorded daily). The Eleventh Schedule that relates to provision of a permit for a recreational competition also requires submission of catch returns. A recreational lodge fishing permit issued under Schedule Eight does not require catch returns to be submitted. The reason that recreational fishers/lodges do not have to submit catch returns appears to be an anomaly and means that, with the exception of the recreational fishing competitions, the DWNP is not collecting any data from this fishery. Equally, because the subsistence fishers do not require licenses, catch data from this fishery are also not being collected.

Frame Surveys

Frame surveys are used to provide an indication of the available effort in a fishery. Among others, the parameters usually surveyed and quantified would include the demographics and number of participants in the fishery, vessel and gear types, their use, and the spatial distribution of fishing effort, landing sites, and marketing and distribution networks. Over time, they are useful in terms of monitoring changes in the fishery. The last frame survey of the delta fisheries was undertaken in 2005, and there is little long-term information that characterizes the number of fishers and fishing gears in use. The full report of Shipton recommends regular standardized frame surveys (e.g., annual, biennial, every five years) to enable the DWNP to accurately assess levels of participation and effort in the fisheries. This would enable the department to monitor changes in the fishery and update their management regimes accordingly.

Monthly Fish Surveys

Since 1999, the DWNP has undertaken monthly fish surveys in the Upper Panhandle. Four sites have been gazetted for these surveys. In the lower part of the delta, an additional four sites have been selected. Data collection requires deployment of four fisheries officers/field assistants from Maun and another four from Shakawe. Multi-panel research gill net s (12 - 150 millimeter mesh) that are designed to catch a range of species and size classes are deployed overnight for up to 12 hours. The data recorded include mesh size, CPUE, species, length/ weight, and gonad state. The data are recorded in PASGEAR and sent to the head

office in Gaborone. The capacity to use these data lies with researchers at the Okavango Research Institute. Concomitant with all national departments, DWNP has finite resources, and the monthly survey requires allocation of significant human and financial effort. Shipton's report noted that long-term monitoring data of this nature is useful in terms of characterizing long-term changes in the fishery, but recommended a review of the monitoring frequency.

Other DWNP Agencies

Law Enforcement Unit (DWNP)

In addition to compliance activities undertaken by the Fisheries Division, there is also a regional DWNP law enforcement unit that is designed to address compliance issues for all the DWNP. It would appear that the major focus of this unit is to address terrestrial compliance issues and thus, although the unit may address fisheries compliance issues as and when they arise, they do not actively involve themselves in fisheries compliance operations, thus the responsibility for fisheries compliance falls to the Fisheries Division.

Research Division (DWNP)

The research division is mandated to undertake and coordinate research for the DWNP. The focus of the research division is largely on terrestrial issues; it has no fisheries research capacity. Effectively, therefore, the responsibility for research and monitoring of fish stocks falls to the Fisheries Division.

Local Institutions in the Delta

The Okavango Research Institute, the University of Botswana

The Okavango Research Institute, formerly the Harry Oppenheimer Research Centre, based at the University of Botswana, Maun, has significant research capabilities that could be co-opted by the Fisheries Division to assist in managing its research needs. There is, however, no formal memorandum of understanding or formal link between the two organizations.

Okavango Fisheries Management Committee (OFMC)

The Okavango Fisheries Management Committee was set up in 1998 to provide a forum to assist in management of the fisheries resources in the delta and to reduce conflict among stakeholders. In the 2000s, interest in the committee waned, and it was not until 2008 and with the support of the Biokavango project that the committee was reconvened. The committee is chaired by the DWNP-Fisheries Division, with representation from the Department of Tourism, Department of Water Affairs, the Land Board, the Okavango Research Centre (ORC), and the Okavango Fishers Association (OFA), and the fishing camps and tourist lodges. In 2010, the committee negotiated the Code of Conduct of Responsible Fishing in the Okavango Delta. The committee meets quarterly.

Okavango Fishers Association (OFA)

The Okavango Fishers Association was formed in 1999 as to represent interests of the commercial fishers. At inception, it had more than 150 members. In 2007, and with the assistance of the Biokavango project, the organization's constitution was revised and its scope expanded to include all stakeholders in the fishing industry. The revised constitution now mandates the OFA to act as an umbrella organization for fisher groups (commercial,

recreational, and artisanal) in the delta. The OFA is a legally registered entity with a constitution that elects office bearers annually. The objectives of the organization are:

1. To provide a representative forum through which the collective voice of concerns and problems of the members can be articulated to government and other concerned parties
2. To liaise with other institutions that are stakeholders of fish resources of the Okavango Delta and represent users and opinions of the members
3. To cooperate with the government in management of fish resources for the benefit of the members
4. To act as a medium through which disputes can be resolved amicably
5. To ensure that the fish resource is used sustainably by advising members to adhere to fish protection regulations

Although membership is open to all stakeholders, the major representation in the OFA is commercial gill net fishers, either as individuals or as fisher groups based at the village level. There is significantly less representation from recreational or subsistence fisher groups. Since 2007, funding and mentorship for the association has been provided by the Biokavango project; however, with the closure of the fisheries component of the project in June 2010, funding has ceased. The association is now self-funding, with contributions by members.

Fisher Associations and Trusts

Many fishers have organized themselves into fisher groups or trusts. These are geographically spread around the panhandle and are in the larger fishing communities. The four main associations are the Boiteko Fish Resources Trust (Samochima), Chechoara Fishing Project (Mohembo), Itékeng Community Trust (Ngarange), and Tubu Multi-purpose Cooperative (Tubu). Typically, these associations were set up with FAP grants, assistance from NGOs, and recently, some have received assistance from the Biokavango program to upgrade their facilities. Typically, the facilities include buildings to house scaling tables, weighing equipment, storage space for the fishing gear, chest freezers or, in the case of the Boiteko Fish Resources Trust, a small freezer room. The associations and trusts consist of groups of 10-15 fishers who pay a levy (normally 10 percent of their catch value) to the group. The funds are used to operate the freezer facilities and pay staff and for equipment repair and depreciation. The fisher associations have representation in the Okavango Fishing Association.

Artisanal Fishers

The artisanal fishers are not well represented in the Okavango Fisheries Association and, they have not formed an association or organization that could be used to represent their interests. Thus, despite their traditional exploitation of the fishing resources of the delta, their interests are not well represented on the Okavango Fisheries Management Committee (OFMC). In the absence of a formal representative body that can elucidate and represent their interests, it will be difficult to include this group of fishers into either co-management or other collective decision-making management processes that the DWNP or the OFMC may recommend.

International Institutions/Transboundary Initiatives

The Okavango River Basin Water Commission (OKACOM)

OKACOM was established in 1994 by Angola, Namibia, and Botswana to promote a coordinated approach to sustainable management of the Okavango river basin. The commission consists of delegations of senior government ministerial officials from each of the three member states. The organization provides a forum for commissioners to discuss and resolve transboundary issues that affect the river basin. The organization is based on the principles of equitable resource allocation, sustainable use, sound environmental management, and sharing of benefits. The Okavango River Basin Steering Committee (OBSC) appointed by the commission in 1995, is the technical advisory body to the commission and provides technical support to permanent or temporary subsidiary committees or task forces. Currently, these task forces include an institutional task force, a biodiversity taskforce, and a hydrology taskforce. Finally, the OKACOM Secretariat provides administrative and financial services to the organization.

OKACOM has operated a number of programs in the delta. From a fisheries perspective, the most important program was the Environmental Protection and Sustainable Management of the Okavango (EPSMO) River Project. This was a GEF/UNDP/FAO-funded initiative that has developed a transboundary diagnostic analysis and formulated strategic action plans for the river system. With the end of project funding for EPSMO, the activities have been funded by the USAID/Southern Africa Regional Environmental Program (SAREP) — a \$23 million program — run through OKACOM. The program is developing national action plans (NAPs) that will be informed by the strategic action plans. Despite the biological and socioeconomic value of the fisheries to the system, the Fisheries Division has no representation in the NAP development process. This is an oversight that should be rectified.

From a fisheries management perspective, OKACOM provides a compelling vehicle with which to effectively address transboundary issues. Although issues such as fish movements between the riparian countries, fish conservation, and ensuring equitable access to fish resources are obvious issues that need to be addressed, a number of more pressing issues need to be addressed in the short term. Principally, these are introduction of fish disease to the system and introduction of alien species, possibly for aquaculture purposes. The recent introduction of EUS to the system provides a graphic example of how fish introductions can have system-wide implications (Andrew et al., 2008). The introduction of alien species for aquaculture is also of serious concern. Although Namibia and Botswana have decided to focus their aquaculture activities on indigenous species, it is reported that Angola has authorized the introduction of the Nile tilapia (*Oreochromis niloticus*) for fish farming in Central Angola. Due to its high growth rate and good production characteristics, *O. niloticus* is often the culture species of choice for many farmers. However, it is highly invasive, and once in a system, it almost always either outcompetes the indigenous *Oreochromines* or hybridizes with them (Canónico et al., 2005; Tweddle & Wise, 2007). The results are significant losses to biodiversity and irreversible structural changes to fish populations and fisheries. Clearly, the introduction of an alien tilapia species into the Okavango river system in Angola will have very serious implications for downstream fisheries in Namibia and Botswana. Whether Angola has an explicit policy to allow introduction of alien fish species into its catchments or it is simply allowing farmers to move these species between catchments needs to be assessed. In terms of the Okavango River System, at the very least, it would be appropriate to develop a harmonized policy on the introduction of alien species to the system.

Bilateral Agreement Between Namibia and Botswana

In terms of promoting bilateral ties between the two countries to promote cooperation in the fisheries sector, the 4th Session of the Namibia – Botswana joint commission of cooperation in Walvis Bay in October 2008 mandated the Directorate of Aquaculture and Inland fisheries (Namibia) and the DWNP Fisheries Division (Botswana) to discuss collaboration. Agenda items included:

1. Developing a benefit program for inland fisheries
2. Harmonization of fisheries legislation and enforcement
3. ZACPLAN
4. Cooperation under the Zambezi Chobe River Basin Plan (the four-corner project)
5. Data analysis and standardization of research methodology in shared river systems (e.g., combined frame surveys, livelihood studies)

ANNEX 2. SUBMISSION BY KAVANGO OPEN AFRICA ROUTE (KOAR) REGARDING TOURISM CONCERNS ABOUT FISHING ACTIVITIES IN THE OKAVANGO/CUBANGO RIVER SYSTEM

KOAR has been a constructive contributor to the planning workshops for this management plan. On being asked to give a tourism viewpoint on the proposals, the KOAR committee met and provided the following input.

These viewpoints are the input from KOAR as representative of the tourism sector in the Kavango Region.

1. We regard the pricing of the fishing licenses for recreational fishers to be fair, and these should not be increased.
2. The procedures for obtaining these licenses at the moment are unrealistic and impractical. Divundu operators have to travel into Rundu to obtain a license, a distance of more than 400 kilometers. Others go to their local regional council offices to obtain a permit only to find them unoccupied or licensing books unavailable. This whole procedure is detrimental to the tourism sector's operation and leads to animosity. The following suggestions were made:
 - It was suggested that blank permits be bought by the lodge concerned as a book or quantity, with the onus on the lodge to issue the permits as required for each guest.
 - It was agreed that there should not be a flat fee levied based on the number of beds of a lodge. Not all lodges and tourism operators offer fishing activities for their guests.
 - A fixed annual license fee per lodge covering, say, four permits. Additional permits are then issued as required with the accepted procedure.
3. Non-tourism boats on the river are regarded as detrimental to the entire tourism sector unless regulated. Private individuals —local or from neighboring countries — have no problem operating their boats on the river totally unregulated and with no respect or regard for tourism operations and river communities. The following suggestions were made:
 - Apart from the required fisheries permits, all private boats should be heavily permitted, with a fee more than those of the registered tourism/recreational sector.
 - All legitimate homesteads, registered lodges/camps and campsites, communal washing points, and properties that have river frontage with a clearly placed signboard indicating it as such should be respected by passing boats, which must be required to adhere to a "No Wake Zone" by going slowly. This situation works well in Botswana and therefore should also be the case in Namibia.
4. Serious thought must be given to the terminology used in the Fisheries Act with regard to "subsistence", "commercial" and "recreational" fishermen as we see a serious overlap and misconception.
5. The use of nets should be banned on the Okavango River because they lead to illegal practices like drag-netting and commercial operations and ultimately to over-fishing

or over-exploitation of fish stocks. Alternatively, the net lengths should be limited to 20 meters.

6. The Okavango River system cannot withstand or sustain any commercial fishing operations.
7. The tourism sector is aware that cooperation of the Angolan authorities is essential to any successful form of development, research, or law enforcement on the Okavango River. However, we are not able to assist or advise because this is clearly a government decision process.
8. The tourism sector supports the “Honorary Fisheries Inspector” concept, and we would like to be considered as candidates when this process has been agreed to.
9. The annual Crockango Fishing Competition is regarded as beneficial to the river and the Kavango Region in many ways. However, it was felt that the regulations and rules governing this event and the participants are not adequate to prevent certain members from abusing the river and having a negative impact on local river communities, particularly many tourism operations.
10. The legitimate tourism operations on the Okavango River are committed to the health of the river ecosystem and well-being of the river communities. We are therefore open to assisting in any way possible with the sustainable management of this system. We are all established entities with long-term commitments and responsibilities, with a range of resources and expertise.

ANNEX 3. LEGISLATION TO BE DISCUSSED AS PART OF HARMONIZATION

	Botswana	Namibia	Angola
<p>Fishing Gear Prohibited, Allowed, and Limited</p> <p>(See Note 1)</p>	<p>Fish Regulations: 20. 1) No person shall catch fish by a) setting nets across a lagoon entrance or river channel, b) drive fishing, c) seining, or d) using a mosquito net. Article 4 of the Fish Protection Act prohibits the use of explosive, poisonous, or noxious substances for the purpose of killing, stunning, or disabling fish to render them more easily caught.</p>	<p>Fisheries Act: 16. A person may not for the purpose of fishing use or have in his or her possession a net, unless the net a) is a net of which the use is authorized by a fishing license, b) is marked in the prescribed manner, and c) conforms to prescribed requirements.</p> <p>17. 1. A person may not use for fishing a) any chemical, poison, poisonous plant, or any noxious or other injurious substance; b) any explosive, firearm, or electrical device; or c) any light at night to lure or attract fish.</p> <p>2. A person who uses a net for fishing may not use the net a) within 100 meters of a bridge, culvert, or spillway when water is flowing through such structures; or b) in a manner that obstructs more than one-half of the width of any watercourse where fishing is carried out. <i>Namibian Fisheries Act also has section for allowable fishing gears, i.e.</i></p> <p>Fisheries Act: 11. Authorized means of fishing include a) a rod, reel, line, and hook only; b) a net only; or c) both a rod, reel, line and hook and a net.</p>	<p>Decree Article 31 states that the following is prohibited: a) trawling in bays, estuaries and harbors; b) dragging on the ground; c) in pair trawling; d) use of dual net trawl; e) any drift gill net; f) any fishing gear that adversely affects the sea or inland waters; g) light sources for attracting fish. Also prohibited is the use of any device that could obstruct or in any way reduce effectively the size of the mesh size so that it does not correspond to the authorized specification.</p> <p>Decree Article 37 Section 2 states that when fishing or diving underwater the only materials that may be used are spears and slingshots or other fishing gear driven by the physical strength of the practitioner and these must appear on a list approved for the purpose by the minister of Fisheries.</p> <p>Decree Article 33 allows the use of floating devices for concentration of schools. The minister defines the conditions, installation, and use of floating devices. Section 3 mandates that semi-industrial and industrial fishing operations must use a turtle excluder device on trawl fishing.</p> <p>Article 104 of the Aquatic Biological Resources Act prohibits a) the use of fishing explosive, toxics or electrocution to render a fish weak, stunned or killed; b) keeping on board a fishing vessel materials and substances that could be used in carrying out prohibited activities.</p> <p>Article 113 of the Aquatic Biological Resources Act prohibits the use of any kind of drift gill net.</p> <p>Aquatic Biological Resources Act Articles 25, 26, 28 Regime Limits to Fishing Effort</p> <p>Where it is not possible to establish total allowable catches, spatial fisheries regime obeys the definition of fishing effort limits. The scheme limits fishing effort with the definition of criteria including, minimum dimensions of species and capture, sub-area and fishing areas, number of vessels authorized to fish in each zone, gear and fishing methods used and time spent fishing. Fixing the limits of effort must be based on the development plans of fisheries and the criteria contained therein, in particular the criteria of technical, scientific and socio-economic of each fishery or fishing zone.</p>

	Botswana	Namibia	Angola
Exotic Species Introduction (See Note 2)	Fish Regulations: 21. 1) No person shall, without a permit from the Director, move fish from one water body to another water body.	Fisheries Act: 19. A person may not without written permission granted by the minister - a) introduce or cause to be introduced into any inland water system, or transfer from one water system to another, any species of fish; b) import into Namibia any live fish; c) export from Namibia any live fish declared as an endangered species.	Article 201 of the Aquatic Biological Resources Act states that the minister must approve, by executive order, the rules on the introduction and cultivation of exotic species.
Fishing at Night and Use of Light Sources (See Note 1)	Fish Regulations: 19. 1) No person shall catch fish at night except by the use of gill nets which have been set and left stationary in the water before or after the night.	17. 1. A person may not use for fishing - c) any light at night to lure or attract fish.	The Aquatic Biological Resources Act Article 105 prevents the use of light sources for attracting fish
Open Season (See Note 3)	Fish Regulations: 11. Open season is from March 1st through December 31st each year.		
Gill Net Length (See Note 4)	Fish Regulations: 8. 1) No person shall catch fish with gill nets exceeding a total length of 150 meters	Inland Fisheries Resources Regulations: Inland Fisheries Resources Act, 2003. Restriction on number of gill nets to be registered. 13. A person is not allowed to register more than four gill nets.	
License (See Note 5)	Fish Regulations: 15.1) No person shall undertake recreational fishing without a recreational fishing license issued by the Director. 3) No person engaged in recreational fishing shall catch and keep more than five fish in one day. 4) A fishing camp shall be issued an annual fishing permit. 16. Any person participating in a recreational fishing competition must have a recreational fishing competition permit.	Fisheries Act: 11. A person may not engage in fishing in any inland water by means of any regulated fishing gear without a license.	Decree: Article 36 1) fishing or underwater commercial diving requires a license and must be done under given framework 2) For tourism activities, fishing or diving need a special license.

	Botswana	Namibia	Angola
<p>Fishery Councils</p> <p>(See Note 6)</p>		<p>Fisheries Act: 4. The Council consists of the Permanent Secretary and other persons as the minister may appoint.</p>	<p>Decree: Article 13 The level of each province can be created Partners Fisheries Councils composed of fishing associations, local fishing communities and coastal communities as well as local non-governmental organizations whose main business focuses on fisheries or aquatic environment.</p> <p>Decree: Article 15</p> <p>(Duties of the board of partners)The duties of the Board of Partners for Fisheries: a) Make recommendations on issues concerning the preparation of development plan fishing; b) Make recommendations on any existing or in preparation for the fishing industry; c) Make recommendations to the Ministry of Fisheries on measures of preservation and conservation of the species; d) Assist the Ministry of Fisheries in concrete measures and practices aimed at eliminating gear, methods and practices harmful to fish; e) Report violations of fisheries legislation and request the intervention of the competent authorities in their elimination; f) Assist the Ministry of Fisheries in the detection and control of unauthorized fishing unreported and unregulated fishing in Angolan waters.</p>
<p>Game Park or National Reserve</p> <p>(See Note 7)</p>	<p>Fish Regulations: 3. The Fish Regulations shall not apply within a game reserve or national park.</p>	<p>Fisheries Act: 18. A fishing license does not authorize the holder to fish in an area which has been declared as a game park or nature reserve or enter land owned or under the control of any board, institution, or authority without permission from that party.</p>	<p>Aquatic Biological Resources Act: Rule 81, An aquatic national park is established by the government on a joint proposal of the competent minister and minister in charge of environmental policy, as well as the ministries that oversee the water sector, in the case of inland waterways and maritime transport. It is meant to preserve the biological diversity and ecological integrity of one or more ecosystems, biotic communities, genetic resources and species, preserve landscapes of historic and aesthetic value as well as providing uses for scientific, educational, cultural, recreational, and tourism. It park and prohibited to capture or extract a particular natural resource or to pursue economic activities that may disturb the natural environment. No exotic species may be introduced to the park and entering or transiting through the park is allowed only with specific permission.</p>

	Botswana	Namibia	Angola
Protected Species (See Note 8)	Fish Protection Act: 3. The minister may make regulations that provide for the more effective control, protection and improvement of fish, and the government and management of any specified area in which fishing may be carried on.	Fisheries Act: 21. 1) The minister may declare any species of fish as an endangered species for the purpose of protecting or regenerating such species.	Decree: Article 21 prohibits the intentional fishing of rare or endangered species. In the presence of a fisheries management plan, the minister of Fisheries, may approve additional lists of species depending on need and application of the precautionary principle.
Shared Resources/International Agreements (See Note 9)		The Fisheries Act requires the minister, among other things to promote the co-operation with other countries for research, management, and development of shared resources.	Decree: Article 28 (Shared Resources) When the state of Angola shares with other states, certain species must cooperate with these countries or through international organizations or regional in determining and implementing measures to conserve and manage these species in accordance with the rules and standards. Aquatic Biological Resources Act: Rule 87 (International Cooperation) 1. In the case of shared water resources and ecosystems, the government should ensure cooperation with other states, bilaterally and multilaterally, for defining protection areas. 2. The state should cooperate with international organizations, in particular for protection of resources of the high seas.
Reserves (See Note 10)		Fisheries Act: Fisheries reserves and limitation of licenses 22. (1) The minister, on his or her own initiative, or in response to an initiative of any regional council, local authority council or traditional authority, and in consultation with the regional council, local authority council or traditional authority concerned, may by notice in the Gazette declare any area of inland waters as a fisheries reserve if the minister considers that special measures are necessary for reasons including, preservation of the aquatic environment and to protect fish resources and their environment. A person may not in a declared fisheries reserve engage in any activity for fishing or extraction of material. If the minister is of the opinion that the sustainable utilization of fish is threatened, the minister may by notice in the Gazette prohibit or limit the number of licenses that may be issued in respect of	Aquatic Biological Resources Act: Rule 82 (Aquatic Nature Reserves) 1. The aquatic nature reserves are protected areas whose objectives are the preservation of biodiversity, conservation, sustainable regeneration and renewal of aquatic biological resources, especially protected species under Section II of this chapter, the protection and rehabilitation of ecosystems and habitats, especially those degraded as well as providing uses for scientific, educational, cultural, recreational, and tourism. 2. Nature reserves' aquatic character may have full or partial, temporary, or permanent, taking into account the need to protect and conserve resources. 3. In aquatic nature reserves with total character can only be exercised subsistence fishing, to the maximum amount, per fishers per day, 20 kilograms, except it is a single specimen weighing more. 4. In aquatic nature reserves with partial nature can be exercised subsistence fishing and fishing as may be specially authorized by the competent minister pursuant to define by regulation. 5. The aquatic nature reserves are established by joint executive decree of the competent minister, the minister who oversees environmental policy as well as the minister in charge of the transport sector, in the case of reserves in the sea or the

	Botswana	Namibia	Angola
		any one or both the types of regulated fishing gear either in general or in respect of a particular area or for a specified period.	minister that oversees the water resources sector, in the case of continental waters. 6. The executive decree referred to in the preceding paragraph should set the rules of natural water reserves in accordance with their character and take into consideration the recommendations of the Integrated Management of Aquatic Biological Resources, the views of the government of the province where the reservation is located and the opinion Specialized Research Institute. 7. The bays and estuaries of rivers are established as nature reserves, without prejudice to its refilling in terms of previous articles.
Mesh Size (See Note 11)		Inland Fisheries Regulations. 18. (1) A gill net shall not be set within 100 meters of another net and the mesh size thereof shall not be less than - (c) 45 mm in the Kavango River	Aquatic Biological Resources Act: Article 97 (Dimension Mesh) The relevant minister must establish the minimum mesh size of fishing gear, as well as standards for measuring these grids and the relevant restrictions. Article 114 of the Aquatic Biological Resources Act allows the competent minister to, by executive order, determine special restrictions as the mesh size, dimensions, exercise areas, guard the other arts and crafts for fishing with gill nets.
Monitoring (See Note 12)		Under Section 30 (m) of the Act, the minister may "provide for the making of surveys and gathering of information..."	Aquatic Biological Resources Act: Article 142 Objectives. One. The monitoring aims to collect information necessary for the planning of fisheries, aquaculture and related activities in order to ensure compliance with the provisions of this law and its regulations. 2nd. The information referred to above include, in particular: a) the number of fishing vessels by zone, type of vessel and fishing; b) the characteristics and selectivity of fishing gear; c) the means of technological support navigation or fishing and efficiency; d) seasonal changes in fishing effort and fishing; e) the location of fishing against other fleets; f) the historical evolution of catches and fishing effort by fishery; g) the composition of catches by fishery by size and other biological characteristics; h) the quantity, species composition, and biological characteristics of the catch and discarded; i) the ability of fish processing establishments and their needs supply of fish; j) the environmental, economic and social planning measures, in particular as regards fishing effort; k) The offenses fishing practiced in certain periods, in some fisheries, fishing, fishing types and classes of boats.

	Botswana	Namibia	Angola
Minister (See Note 13)	<p>(1) The minister may make regulations which provide effective control, protection and improvement of fish for all or part of the following: (a) imposing and prescribing conditions for the regulation of fishing; (b) registering all boats employed in fishing; (c) determining the times and seasons at which the taking of any species of fish shall commence and cease; (d) the issuing of licenses and certificates of registration to persons authorized to take any species of fish; (e) prescribing the fees to be paid for or in respect of any license or registration issued or made; (f) providing for and regulating the description and form of nets to be used in fishing and the size of the meshes thereof, or the prohibiting of any special description of nets or meshes or any tackle, instrument or appliance whatsoever tending to impede the lawful taking of fish or being in any manner detrimental to the preservation or increase of fish; (g) prohibiting, restricting, or regulating the bringing into Botswana of any live fish; (h) prohibiting, restricting, or regulating the transfer within Botswana of any live fish; (i) prohibiting, restricting, or regulating the sale of any fish.</p> <p>(2) Regulations made under subsection (1) may require acts</p>	<p>Inland Fisheries Act: The minister must formulate general policy with regard to the conservation and use of the Namibian Inland Fisheries taking into account relevant economic, social, and environmental factors on the basis of the best scientific information available. When applying policy to an area, the minister must consult with the regional council or any other authorities in that area.</p> <p>Numerous other provisions in the act enable the minister to act as necessary when intervention is necessary, e.g., provision for establishing activities that may be undertaken in a Fisheries Reserve gazetted under Section 22 of the act</p>	<p>Aquatic Biological Resources Act: Article 97 (Dimension Mesh) The relevant minister must establish the minimum mesh size of fishing gear, as well as standards for measuring these grids and the relevant restrictions. Article 114 of the Aquatic Biological Resources Act allows the competent minister to, by executive order, determine special restrictions as the mesh size, dimensions, exercise areas, guard the other arts and crafts for fishing with gill nets.</p>

	Botswana	Namibia	Angola
	or things to be performed or done to the satisfaction of an authorized officer and may empower such officer to issue orders requiring acts or things to be performed or done or prohibiting acts or things from being performed or done, and may prescribe periods or dates upon, within or before such acts or things are to be performed or done.		
Note 1. Light attraction, poisons, explosives, dragnets prohibited by all; block nets prohibited in Botswana (across lagoon entrances) and Namibia (more than halfway across watercourse); drifting nets prohibited in Namibia and Angola.			
Note 2. Alien species: Namibia and Angola need minister permission, Botswana only director. Latter needs modification to harmonize with others and provide better security at a higher level of government.			
Note 3. The closed season is a contentious issue. A separate table is provided below noting the pros and cons of having a closed season.			
Note 4. Transboundary agreement on gill net s needed for Namibia and Angola for the length of their shared boundary. Harmonization between Botswana and Namibia less important.			
Note 5. Each country has its own fishing license regulations. Transboundary agreements needed for Namibia and Angola for the length of their shared boundary.			
Note 6. This part covers coordinating bodies that may or may not be present in the three countries, and that may be used to help implement activities proposed under this transboundary fisheries management plan. Botswana has two fishers organizations, that can potentially be incorporated into a fisheries council for the delta and panhandle. The Okavango Fisheries Management Committee is a forum for government agencies to interact with fishers and therefore plays a similar role to a formal fisheries council. The Okavango Fishers Association is an association for fishers from the commercial, subsistence, and recreational fishing sectors.			
Note 7. Policies between the three countries are fully harmonized already.			
Note 8. Policies on protected species fully harmonized in the three countries.			
Note 9. Namibian and Angolan acts are in agreement. Botswana act needs to be modified to include similar provision.			
Note 10. Namibian and Angolan acts are in agreement. Botswana act needs to be modified to include similar provision for reserves/protected areas.			
Note 11. Botswana regulations need to be checked. Namibian minimum mesh size regulation needs upward revision.			
Note 12. Botswana and Namibian acts do not explicitly recognize monitoring in regulations			
Note 13. In all countries the minister has wide powers to make regulations and to react promptly to changing circumstances in the fisheries.			

ANNEX 4. ARGUMENTS FOR AND AGAINST HARMONIZED TRANSBOUNDARY CLOSED SEASONS FOR FISHING

ARGUMENTS FOR	ARGUMENTS AGAINST
BIOLOGICAL REASONS	
The majority of fish species breed early in the rains and will therefore be protected from fishing at this vulnerable time	Although most fish species breed during the rains, the main species targeted by fishers, i.e., the large cichlid species such as tilapia, start to breed earlier. The closed season therefore starts too late in the year to protect the main target species, which begin to breed by September when the water is warming up but the river level is low.
Fishing pressure in Namibia is rapidly increasing, proved by experimental catch rates, therefore any reduction in effort will be useful in providing protection, and a closed season is one way of reducing overall effort.	In Botswana, it is argued that there is no overfishing overall because large areas of the system are inaccessible to fishers.
	Fishing by women and children with fine-meshed nets and traditional baskets for the small, highly prolific, pioneering floodplain species needs to be encouraged as the life cycle of these small fish species is adapted to the highly fluctuating floodplain environment. They grow rapidly and breed prolifically to take advantage of the annual flood to occupy new habitats. Because of this, there is no risk of overfishing. The time when these fish are exploitable is a time when rural communities often experience food shortages and should be encouraged to take advantage of this valuable food resource. This period, however, coincides with the closed season.
POLITICAL AND CULTURAL REASONS	
Harmonization of regulations between countries sharing a natural resource is highly desirable. Namibia shares fish resources with two countries that have closed seasons (Botswana on Kavango and Chobe Rivers, Zambia on Upper Zambezi). Having a closed season on one side of the border and not the other leads to conflicts between fishers, migration of fishers from one country to the other to exploit resources, and great difficulty in enforcement of regulations as fishers move from one side of the river to the other. (Declaration of a closed season in Namibia to harmonize with Botswana will then necessitate similar harmonization with Angola, and therefore any such agreement will need to involve the three countries at once, and not just a bilateral agreement between Botswana and Namibia.)	The closed season deprives poorest in society of an important sustainable protein source at the most difficult time of year in terms of food availability.
Establishing a closed season in Namibia and Angola will need close consultation with stakeholders, providing an opportunity for raising awareness and understanding of management and conservation issues in the communities.	Establishing a closed season will deprive small-scale fish traders (largely female in this area) of income for the duration of the closed period. This can be balanced by ensuring stakeholders are fully aware of the ban so they can make alternative plans for income generation (saving earnings in the open season or trading in other commodities). If the closed season is successful in terms of

ARGUMENTS FOR	ARGUMENTS AGAINST
<p>The closed season coincides with the time when many fishers stop fishing anyway to concentrate on farming activities such as field preparation, weeding, and guarding crops against wildlife, birds, etc. At this time, therefore, having a closed season has least impact on fishers' livelihoods.</p>	<p>stock conservation, overall earnings over the full year are likely to be greater.</p> <p>Each country has its own national interests to take into account in addition to its international obligations. Each country's decision-makers must therefore make their own decisions for or against establishing a closed season for the fishery based on the arguments supplied.</p>

ANNEX 5. LOGICAL FRAMEWORK FOR IMPLEMENTATION OF THE TRANSBOUNDARY FISHERIES MANAGEMENT PLAN

This framework does not include time frames or expected quantities, as it is the function of the steering committee from the three countries to develop the program of implementation.

	Intervention Logic	Objectively Verifiable Indicators of Achievement	Sources and Means of Verification	Assumptions
Overall Objective	<i>Contributing towards improving and maintaining the fish resources of the entire Okavango River Basin at a sustainable level thereby improving food security in the region.</i>	<i>Catch statistics, research reports, scientific papers. Formal transboundary management and research agreements. Functioning steering committee.</i>	<i>Catch statistics and research/monitoring results/reports show that fish resource is healthy and sustainably utilized. Committee minutes.</i>	<i>Government fisheries departments in agreement with all objectives. Governments taking ownership of this initiative. Funding secured from government departments and donor organizations (e.g. including SAREP and NNF/EU Community Conservation Fisheries in KAZA Project and its associated research projects).</i>
Specific Objective	<i>A joint management system established to ensure the conservation and sustainable use of the shared fish resources of the Cubango-Okavango River system for the benefit of local communities</i>	<i>Fully established joint management system in place accepted by all stakeholders.</i>	<i>Management plan and fully functioning throughout the river basin. Minutes from joint meetings held between all stakeholders. Research and monitoring results published.</i>	<i>Joint management system a high priority for all countries. All stakeholders in agreement with all objectives. Buy-in from all communities and active participation in managing their resources. Funding for transboundary programs secured.</i>
Expected Results (1)	<i>Effective collaboration and communication established between all stakeholders, local, national and international.</i>	<i>Steering committee in place and fully functional. Stakeholders represented on steering committee. Tourism associations involvement. NGO involvement in programme activities (particularly SAREP and</i>	<i>Steering committee meeting minutes. ToR of steering committee. Minutes from meetings held between stakeholders (communities, departments, NGOs, tourism representatives, etc.).</i>	<i>Willingness of stakeholders to attend meetings</i>

	Intervention Logic	Objectively Verifiable Indicators of Achievement	Sources and Means of Verification	Assumptions
		<i>NNF).</i> <i>University involvement in capacity building (particularly ORI and UNAM)</i> <i>All stakeholders informed about all activities.</i>	<i>Project reports.</i>	
Expected Results (2)	<i>Standardized research and monitoring in place and resultant shared databases in place.</i>	<i>Agreed standardized monitoring schedule.</i> <i>Joint monitoring surveys conducted.</i> <i>Regular surveys conducted independently by respective fisheries departments.</i> <i>Databases active.</i> <i>Reporting to JPCC on progress made.</i>	<i>Reports on joint surveys published.</i> <i>Databases with data entered available for accessing.</i> <i>Regular data entering by fisheries departments.</i> <i>Minutes available from JPCC meetings held on progress made.</i>	<i>Equipment available for surveys.</i> <i>Necessary funds and manpower available from all countries and donor organizations.</i> <i>Trained staff.</i>
Expected Results (3)	<i>Harmonization of fisheries legislation</i>	<i>Legislation between different fisheries and neighboring countries harmonized with similar objectives.</i> <i>Joint patrols conducted.</i> <i>Reporting to JPCC on progress made.</i> <i>Fully implemented community based fisheries management systems in place.</i> <i>Communities fully involved in all decision-making and planning of fishery management activities.</i>	<i>Documentation available to indicate harmonized rules and regulations.</i> <i>Amendments to fisheries acts & regulations gazetted.</i> <i>JPCC documentation on progress made.</i> <i>Joint patrol reports available.</i> <i>Project reports.</i> <i>Fishers' committee minutes.</i>	<i>Input provided by fisheries departments regarding their legislation and management goals.</i> <i>Collaboration of all stakeholders.</i> <i>Willingness to harmonies legislation.</i>
Expected Results (4)	<i>Integrated work plans developed and operational based on the proposed outputs of this management plan</i>	<i>Steering committee meeting at least annually.</i> <i>Management recommendations agreed based on results of research and monitoring programme.</i> <i>Fully integrated transboundary work plans agreed and implemented.</i> <i>Logical Framework populated with</i>	<i>Steering committee minutes.</i> <i>Detailed Logical Framework</i> <i>Detailed work plans for each country.</i> <i>Fisheries Management Plans adapted to local situations.</i>	

	Intervention Logic	Objectively Verifiable Indicators of Achievement	Sources and Means of Verification	Assumptions
		<i>target dates and expected results. Fisheries management plans implemented based on results achieved from research and monitoring programs.</i>		
Expected Results (5)	<i>Co-management programme established, and communities managing fisheries through community fisheries committees in collaboration with fisheries departments</i>	<i>Management agreements between fisheries departments and communities. By-laws included in legislation. Fish Protection Areas (FPAs) established (gazetted). Community fisheries committees established for each clearly defined fishery management area, meeting regularly and developing and implementing management plans in cooperation with fisheries departments.</i>	<i>Boundaries and rules and regulations of FPAs documented. Fisheries committee meeting report/minutes available.</i>	<i>Agreement on objectives regarding co-management by all stakeholders. Common vision between stakeholders.</i>
Expected Results (6)	<i>Capacity built in fisheries management, particularly at local community level but also at local government level and in fisheries departments at national level</i>	<i>Community members collecting fisheries data throughout study area. Fisheries scientists from the different fisheries departments conducting fisheries and scientific research throughout study area. Fisheries scientific staff doing post graduate studies. Fisheries officers working in collaboration with communities. Training workshops as required.</i>	<i>Data collected by community members available. Reports produced by fisheries scientists from the different fisheries departments. Workshop proceedings and reports. Fisheries departments' reports. Theses available. Papers published in international peer reviewed journals.</i>	<i>Fisheries staff (scientists and managers) available from the different fisheries departments. Community members appointed as fish monitors.</i>
1. Activities	<i>Effective Collaboration And Communication Established Between All Stakeholders, Local, National And International.</i>	<i>Steering committee in place and fully functional. Stakeholders represented on steering committee. Tourism associations involvement.</i>	<i>Steering committee meeting minutes. ToR of steering committee. Minutes from meetings held between stakeholders (communities,</i>	<i>Funding available for steering committee meetings from government departments and donor organizations. Members able to attend steering</i>

	Intervention Logic	Objectively Verifiable Indicators of Achievement	Sources and Means of Verification	Assumptions
1.1.	<i>Establish A Transboundary Steering Committee To Enhance Communication Links And Facilitate Information Exchange.</i>	<i>NGO involvement in programme activities (particularly SAREP and NNF). University involvement in capacity building (particularly UB-ORI and UNAM) All stakeholders informed about all activities.</i>	<i>departments, NGOs, tourism representatives, etc.). Project reports.</i>	<i>committee meetings. Steering committee meets as scheduled with agreed ToR.</i>
1.2.	<i>Fisheries Departments And Donors/NGOs Agree On Financial And Logistical Support For Programme</i>			
1.3.	<i>Tor Agreed For Steering Committee.</i>			
1.4.	<i>Meetings Held With All Stakeholders (Individually and/or Collectively Depending On Circumstances) For Information Sharing And Dissemination, Initially To Explain Programme, Then At Regular Intervals To Discuss Plans, Activities, And Progress.</i>			
2. Activities	<i>Standardized research and monitoring in place and resultant shared databases in place.</i>	<i>Workshops held by all fisheries departments. Databases available. Database protocol developed. Workshops held for data analysis, training in report and paper writing, and finalization of survey reports. Joint monitoring surveys done.</i>	<i>Workshop proceedings. Data sampling forms available. Entering of data sampled during surveys. Survey reports (results from data recorded) available. Joint papers published in peer review journals.</i>	<i>Funding secured from government departments, NNF/EU Community Conservation Fisheries in KAZA Project and its associated research projects. Stakeholders keep to scheduled programme. Agreement between fisheries departments on database protocol. Qualified scientists available. Common research objectives. Survey equipment available.</i>
2.1.	<i>Workshop held to discuss research and standardization of research methods and monitoring process.</i>			
2.2.	<i>Development of databases.</i>			
2.3.	<i>Training workshops held in data analysis and paper and report writing.</i>			
2.4.	<i>Facilitate research activities in the different countries.</i>			

	Intervention Logic	Objectively Verifiable Indicators of Achievement	Sources and Means of Verification	Assumptions
2.5.	<i>Training workshops held whenever required to accommodate new techniques, project interventions, etc.</i>			
3. Activities	<i>Harmonization of fisheries legislation</i>	<i>Workshop held between all stakeholders.</i>	<i>Workshop proceedings and recommendations made.</i>	<i>Agreement between countries on joint policies with regard to fisheries management goals,</i>
3.1.	<i>Workshop held through steering committee to review policy and fisheries legislation in each country and determine where harmonization is feasible</i>	<i>JPCC meetings to discuss progress and recommendations.</i>	<i>JPCC meeting minutes on harmonization of legislation.</i>	<i>Willingness between countries to harmonize legislation.</i>
3.2.	<i>Report to JPCC on progress made.</i>	<i>Amended legislation gazetted.</i>	<i>Amended legislation available and implemented.</i>	<i>Boats and equipment available to do joint patrols.</i>
3.3.	<i>Communities advised of any proposed changes to legislation and the reasons for the changes.</i>		<i>Joint patrol reports available.</i>	
3.4.	<i>Amendments made to legislation and gazetted to harmonize legislation where agreed.</i>			
3.5.	<i>Joint patrols conducted to sensitize fishers and thereafter to ensure compliance with rules.</i>			
4. Activities	<i>Integrated work plans developed and operational based on the proposed outputs of this management plan</i>	<i>Steering committee meeting at least annually.</i>	<i>Steering committee minutes.</i>	<i>Agreement between countries on goals and work plans.</i>
4.1.	<i>Steering committee meets to develop joint programs as listed in ToR of management plan and to populate logical framework with targets to be achieved (dates and numbers)</i>	<i>Management recommendations agreed based on results of research and monitoring programme.</i>	<i>Logical Framework populated with target dates and expected results.</i>	<i>Funding available for steering committee meetings from government departments and donor organizations.</i>
4.2.	<i>Annual meetings (minimum</i>	<i>Fully integrated transboundary work plans agreed and implemented including fully detailed Logical Framework.</i>	<i>Fisheries management plans implemented based on results achieved from research and monitoring programs.</i>	<i>Members able to attend steering committee meetings.</i>
		<i>Fisheries Management Plans (local and transboundary).</i>		<i>Steering committee meets as scheduled with agreed ToR.</i>

	Intervention Logic	Objectively Verifiable Indicators of Achievement	Sources and Means of Verification	Assumptions
4.3.	<p><i>requirement) of steering committee</i></p> <p><i>Detailed joint programs for research and monitoring agreed and implemented between government fisheries departments</i></p>			
5. Activities	<p><i>Co-management programme established and communities managing fisheries in collaboration with fisheries departments.</i></p>	<p><i>Meetings held with all communities to sensitize them.</i></p> <p><i>Workshops held to discuss co-management and joint research programs.</i></p> <p><i>Potential FPAs identified and approved by all stakeholders including traditional and regional authorities and government departments</i></p> <p><i>FPAs gazetted.</i></p> <p><i>By-laws appropriate to local conditions approved and gazetted.</i></p> <p><i>Community members involved in data collection.</i></p>	<p><i>Minutes and proceedings of meetings and workshop held.</i></p> <p><i>Boundaries of FPAs identified and rules and regulations drafted.</i></p> <p><i>FPAs gazetted.</i></p> <p><i>By-laws approved and gazetted.</i></p> <p><i>Data entered into database collected by community members.</i></p>	<p><i>All stakeholders in agreement regarding the community based approach.</i></p> <p><i>All in agreement with co-management programs developed.</i></p> <p><i>All fishers abide by agreed local by-laws, FPAs and other co-management interventions.</i></p>
5.1.	<i>Fishing communities sensitized by fisheries departments.</i>			
5.2.	<i>Workshops held between communities and fisheries departments to discuss co-management programs.</i>			
5.3.	<i>Discussions held for the establishment of potential FPAs.</i>			
5.4.	<i>FPAs established by communities with assistance of fisheries departments and donor organizations (e.g. SAREP, NNF, and associated partners).</i>			
5.5.	<i>Communities develop by-laws suitable for local fishery conditions in partnership with fisheries departments</i>			
5.6.	<i>Communities participating in monitoring and research activities.</i>			
6. Activities	<i>Capacity built in fisheries</i>	<i>Workshops held.</i>	<i>Workshop proceedings.</i>	<i>Willingness of fisheries department</i>

	Intervention Logic	Objectively Verifiable Indicators of Achievement	Sources and Means of Verification	Assumptions
6.1.	<i>management, particularly at local community level but also at local government level and in fisheries departments at national level</i>	<i>Local community fisheries committees functioning effectively in collaboration with fisheries departments. Strengthened research and management capacity in the region, i.e. qualified scientists. Qualified scientists productively employed by fisheries departments and universities in the fisheries sector in the region.</i>	<i>Scientific reports produced. Papers published. Staff with post-graduate degrees. Scientists employed productively in fisheries research and management in the region.</i>	<i>staff, postgraduate students, and community members to be trained. Post available in the region for staff and students trained through the programme.</i>
6.2.	<i>Workshops held for training purposes.</i>			
6.3.	<i>Communities informed and trained in community-based management techniques, including (but not limited to) committee functioning (roles of managers, secretaries, treasurers, etc.), basic fish biology in relation to fishing activities, etc.</i>			
6.4.	<i>Facilitate research activities in the different countries.</i>			
6.5.	<i>Postgraduate students identified and facilitated (funding from government, donor organizations and approved research projects to conduct research relevant to the aims of this management plan.</i>			
6.6.	<i>Scientists/students conduct data analysis, report writing publishing of papers in peer review journals.</i>			
	<i>Staffing levels of fisheries departments in each country increased and improved by integrating scientists trained through the implementation of the management plan.</i>			

ANNEX 6. PROPOSED FORMS TO BE USED IN THE IMPLEMENTATION OF RESEARCH AND MONITORING

PASGEAR FIELD FORM

Page no: _____

Date: ____/____/____(DD/MM/YY)

Station (full name): _____

Gear: _____.(A/B/C/)

Panel Length (m) or Swept Area (m²): _____

GPS: _____S, _____E

Site ID: _____

Setting Type: _____

Duration: _____h

Pasgear Code:_____

[illegible]

HABITAT DESCRIPTION

Page no: _____

Date: ____/____/____(DD/MM/YY) Station name: _____ Site ID: _____

GPS

(a) ____°S; ____°E

(b) ____°S; ____°E

(c) ____°S; ____°E

(d) ____°S; ____°E

Gear type: _____ Gear code (A,B,D,D etc.): _____.

Site description:

Habitat type: Mainstream ☐ Backwater ☐ Lake/Dam ☐ Side Channel ☐
Floodplain ☐ Rain Pool ☐ Rocks ☐ Isolated Pool ☐

Water depth (m): _____ Water colour: _____ Flow rate: _____
pH: _____ Water temp: _____°C NH₄⁺ _____ Oxygen: _____

Aquatic plants: _____

Bank vegetation: _____

State of bank: _____

External activities: _____

Water sample Yes ☐ No ☐

FISH MARKET — DAILY TURNOVER

This form is to be completed for all fish entering the market on one day to determine weight of fish sold daily.
Survey time 0730 hrs to 1600 hrs.

Date: _____ **Recorder:** _____ **Weather:** _____

[illegible]

Fish Market Survey: Occupancy of Market

Date: _____ **Recorder:** _____ **Time:** _____

Fill in at each stall number whether it is occupied= X or not = O and selling fresh =1 fish or dried =2 fish or mixed = 3 fish.
Survey time 1400-1500 hrs daily: Mon-Tues, Wed-Thurs, Tues-Wed, Thurs-Fri, Mon-Fri. In addition to two Saturdays and two Sundays each month.

1	2	3	4	5							

Fish Market Survey: Composition of Fish on Sale

Selected vendors are asked to allow us to measure and weigh their fish on offer

Date: _____ **Time:** _____ **Vendor name:** _____ **Interviewer:** _____

Count of fish on table and in containers, for minimum five fresh fish vendors. Also complete if vendor sold out day one. Write stall no and sold out.

Stall no day 1	Fish species	Number on table	Number in container		
Same vendor day 2	Fish species	Number on table	Number in container	Reduction in price: From N\$-To N\$	

Count of fish on table and in containers, for minimum five dry fish vendors

Stall no day 1	Fish species	Number on table	Number in container		
Same vendor	Fish species	Number on table	Number in container	Reduction in price: From N\$-To N\$	

Detailed Measurement of Sample of Fish on Table

[illegible]

VENDOR INTERVIEW

Three fresh fish and three dry fish every day.

Date: _____ **Time:** _____ **Interviewer:** _____

Information on fish vendor

Name of vendor (if possible) and stall no: _____

Gender of vendor (female or male): _____

Have you been interviewed before (since 1 Oct 2010) or is this the first time:

First time: _____ Interviewed before: _____ times

How long have you been selling fish? _____ years

Do you rent the market stall from owner or do you own the stall?

Own the stall _____ Rent the stall _____ Price _____

How often are you selling fish at the Katima Fish market?

More than 4 days a week _____ Between 2 and 4 days a week _____

Once a week _____ Two times a month _____ Once a month _____

Less than once a month _____

Where do you live: _____

Where do you get your fish, name of place? _____

How is the selling going? Good _____ Medium _____ Bad _____

Why is it good, medium, bad? _____

How important is fish sales to you?

Most important	<input type="checkbox"/>	As important as piecework and farming	<input type="checkbox"/>	Not important	<input type="checkbox"/>
----------------	--------------------------	---------------------------------------	--------------------------	---------------	--------------------------

Why do you sell fish?

What is the vendor selling?

Fresh	Dried	Mixed/other
-------	-------	-------------

Can you give your reason for your choice?

What is best and worst times of year for selling fish?

Season	Best	Worst	Reasons?
Litabula			
Muunda			
Mahila			
Mbumbi			

Do you prefer to sell a certain fish species/size of fish?

Species preferred: _____

Size preferred: _____

Reason for choice: _____

How do you travel from home to where you buy the fish?

Walking	<input type="checkbox"/>		
Private car	<input type="checkbox"/>	Cost to collect fish	
Taxi/combi	<input type="checkbox"/>	Cost to collect fish	
Other	<input type="checkbox"/>	Cost to collect fish	

How do you travel from home/where you buy the fish to the Katima market

Walking	<input type="checkbox"/>		
Private car	<input type="checkbox"/>	Cost to get to market	
Taxi/combi	<input type="checkbox"/>	Cost to get to market	
Other	<input type="checkbox"/>	Cost to get to market	

How many days or weeks does it take you to collect the fish you have brought to the market?

_____ days or _____ weeks

What causes the biggest delays in getting to the market? Name in order of importance

Rank in order of importance most important: 1, second most important: 2

Getting enough fish	<input type="checkbox"/>	
Getting those fish species you want	<input type="checkbox"/>	
Getting the size of fish you want	<input type="checkbox"/>	
Getting the price of fish you want	<input type="checkbox"/>	
Preparing the fish	<input type="checkbox"/>	
Transport of fish	<input type="checkbox"/>	

How do you obtain the fish you have on sale? Where?

Family member catches the fish	<input type="checkbox"/>	
Buy fish from fisherman on riverside	<input type="checkbox"/>	
Buy fish from fisherman at his village	<input type="checkbox"/>	
Travel to other village to buy fish	<input type="checkbox"/>	
Buy fish from trader	<input type="checkbox"/>	
Buy fish at market	<input type="checkbox"/>	
Other	<input type="checkbox"/>	

What is your marital status?

Married	<input type="checkbox"/>	Household head	
Single	<input type="checkbox"/>	Spouse	
Divorced	<input type="checkbox"/>	Daughter of household head	
Widowed	<input type="checkbox"/>	Responsible for maintenance of children	
Do you have children?	<input type="checkbox"/>	Other relative	

How much money did you spend to pay for this fish today?

Nothing	<input type="checkbox"/>	Less than N\$50	<input type="checkbox"/>	N\$50 to 100	<input type="checkbox"/>	N\$100 to 150	<input type="checkbox"/>
N\$150 to 200	<input type="checkbox"/>	N\$200-250	<input type="checkbox"/>	More than N\$250	<input type="checkbox"/>		<input type="checkbox"/>

How much profit will you make when all the fish are sold after all costs, transport and rent have been subtracted?

Nothing	<input type="checkbox"/>	Less than N\$20	<input type="checkbox"/>	N\$20 to 50	<input type="checkbox"/>	N\$50 to 100	<input type="checkbox"/>
N\$100 to 150	<input type="checkbox"/>	N\$150-200	<input type="checkbox"/>	N\$200 to 250	<input type="checkbox"/>	More than N\$250	<input type="checkbox"/>

For fresh fish vendors only:

- 1) Was all fresh fish brought to the market today, if no how many days ago

- 2) What proportion of all the fish taken to the market for sale was left over from the previous days (including fish in the cooler boxes not on display):
All _____ Three quarter _____ Half _____ Quarter _____ None _____
- 3) How many days does it take to sell all the fish brought to the market?
_____ days
- 4) What fish is difficult to sell (f. ex. Small fish or some fish species)

- 5) What is the price for the fish of today and what is the reduction in price for old fish from previous days?

May I ask some other personal questions?

Level of education: completed grade

3	4	5	6	7	8	9	10	11	12	Post school
---	---	---	---	---	---	---	----	----	----	-------------

What is your age

20-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	more
-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	------

Thank you for your cooperation!

FISHERIES MONITORING DATA SHEET

Instructions: All fish measured or counted and weighed for a gillnet

Page No _____

Date: _____ **Time:** _____ **Place:** _____ **Recorder:** _____

[illegible]

FISHERIES DATA SHEET (BULK RECORDING)

Bulk Recording for each canoe/fisherman

Page No _____

Date: _____ **Time:** _____ **Place:** _____ **Recorder:** _____

[illegible]

FISHERIES FRAME SURVEY

Form A. Village/Fishing Camp Characteristics

CONFIDENTIAL

Name of Recorder: _____ Date: _____ Time: _____

Name of area: _____ Name of Village/ camp: _____

Age of Village: _____. Population size: _____ Number of households: _____

GPS: S: _____ E: _____

Village Headman: _____ Village Foreman: _____

Number of fishing boats by type:

1. Canoes _____
2. Fiberglass/plastic boats _____
3. Engine powered boats _____
4. Other boats _____ Total _____

Number of fishers at camp/village by type:

5. Boat and net owners _____
6. Net owners _____
7. Boat owners _____
8. Other fishers [traps, baskets] _____ Total _____

Is this village/camp it occupied permanently? Yes _____ No _____

How many months a year is the camp occupied? _____ Months

If this camp is temporary, what is your home village? _____

What agricultural activity takes place here?

None _____ Maize _____ Millet _____ Sorghum _____ Vegetables _____
Pumpkin _____ Beans _____ Cassava _____ Sweet potato _____
Others _____ Describe _____

Where are these activities? Dry upland _____ wet floodplain _____

Notes: (such as condition of village, behavior of people interviewed)

FISHERIES FRAME SURVEY

Form B. Fisher Characteristics

Name of Recorder: _____ Date: _____ Village(s): _____

Fisher Code	Age	Sex	Citizen-ship	Language group	Marital Status	Your position in household	How many dependants	Other sources of income of household	Which income is most important?	Years Fished	Years living In this village/ camp	How do you dispose of your fish?	What do you do apart from fishing?
meaning: 1. letter of river system Z, C, F, L, K 2-3.=letter abbreviation of area 4. number of enumerator 5-6. number of fisherman			Country N = Namibia, B= Botswana O= other	1.Kwangali 2. Gcricu 3. Mbukushu 4. Rumanyo 5. Nyemba 6. Mbunda 7. Chokwe 8. Mbukushu 9. Other	1.Married 2.Single 3.Divorced 4.Widower 5. Other	1. Head 2.Son/ daughter 3.Son/D in law 4.Brother/Sister 5. Grand child 6.Other relative 7. Domestic worker 8. Visitor 9. Other	Give number	1. Cattle 2. Crops 3. Govern-ment job 4. Remit-tances 5. Pension 6. Grants 7 Shop/ trade 8. Piecework 9. Other	1. Fishing 2. Cattle 3. Crops 4. Govern-ment job 5. Remit tances 6. Pension 7. Grants 8.Shop/trade 9. Piecework 10. Other	Give years	Give years	1. Family takes to market 2. Sell to people from village 3. Sell to vendors from Town. – [RU] 4. Keep fish for eating. 5. Dry fish for later use. 6. Other	1. All I do is to fish 2. I fish and farm 3. I have other business as well 4. I have other income/ grants/salary

FISHERIES FRAME SURVEY

Form C. Fishing Gear

CONFIDENTIAL

Name of Recorder: _____ Date: _____ Village(s): _____

Fisher code	Boat type & number		Gear type, number and use									
	Type	#	Type	#	Mesh size, inches		Length of net mounted, m		Twine thickness	Owner of gear?	Status in fishing employment	Number of years this type of gear is used?
1. river system 2-3. area 4. recorder 5-6. number of fisher	1. Canoe 2. Fiber/metal plank boat 3. Engine 4. Borrowed 5. Other		1. Gill net 2. Drag net 3. hook 4. Bashing 5. Traps, baskets 6. Others		Stretched mesh in inches or hook size		Length of net used to fish in m. Do not give length as bought or on label		2, 3, 4, 6, 9, 12 or other ply	1. No 2. Yes 3. Hired 3. Borrowed 4. Given	1. Self employed 2. Hired 3. For family 4. Helping	Give number

FISHERIES FRAME SURVEY

Form D. Fishing Activity

CONFIDENTIAL

Name of Recorder: _____ Date: _____ Village(s): _____

Fisher Code	Best time to fish	Worst time to fish	Fulltime, Seasonal, Part-time or Occasional fisher?	Where do you fish?	Do you fish with a valid license?	Who do you ask to fish?	Do you pay for fishing?	Who shares the areas you fish in?	Are catches good?
	1. summer 2. flood 3. winter 4. spring		1. Fulltime = 6+m/y 2. Seasonal = one season/y 3. Part-time = do other jobs as well 4. Occasional = once/y or for sport 5. Other	1. Mulapos 2. Channels 3. Main channel 4. Backwater 5. Flood plain 6. Other 7. All	1. No license 2. valid license 3. non valid license	1. Induna 2. Relatives 3. Neighbors 4. No one 5. Government. 6. Khuta 7. Other	Yes or no Indicate amount if yes	1. Family 2. Neighbors 3. Lodges 4. Friends 5. Foreigners 6. Everyone 7. No one	1. Yes 2. Have declined 3. Very low 4. No 5. Don't know 6. Other

FISHERIES FRAME SURVEY

Form E. Present Resource Management

CONFIDENTIAL

Name of Recorder: _____ Date: _____ Village(s): _____

Fisher Code	What type of fishing is banned here?	Who says it is banned?	What illegal fishing happens here?	By who?	What happens if they are caught?	Have there been conflicts here?	With who?	About what?	What do you know about fishery laws?
	1. Small meshes 2. Dragnets 3. Bashing 4. Lamp 5. Poison 6. Closed season 7. Other	1. Headman 2. Govt. 3. Traditional authority 4. Fishermen 5. Conser-vancy 6. All 7. Other	1. Small meshes 2. Dragnets 3. Bashing 4. Lamp 5. Poison 6. Closed season 7. None 8. Other	1. Fishers here. 2. Namibians 3. Other	1. Fine 2. Take nets 3. Arrest 4. Warning 5. Nothing 6. Other	Yes or no	1. People here 2. Namibians 3. Wildlife 4. Other	1. Fish without asking 2. Using banned methods 3. Too many nets 4. Wildlife 5. Other	1. Nothing 2. Little 3. Wants to know more 4. Knows well

FISHERIES FRAME SURVEY

Form F. Future Resource Management/Knowledge of EUS

Name of Recorder: _____ Date: _____ Village(s): _____

Fisher code	Should the fishery be regulated?	If yes, by who?	What should the regulations be used for?	What is the most important way of making sure there is enough fish for everyone?	Are you prepared to pay for a fishing license?	How should such money be used?	Do you know the fish disease known as EUS? Have you seen it?
	1. Yes 2. Don't know 3. No 4. Other	1. Traditional authority 2. Government 3. Conservancy 4. Fisheries committee 5. All 6. Other	1. Conserve fish 2. Keep outsiders out 3. Protect fish breeding 4. All 5. Other	1. Closed seasons 2. Ban dragnets 3. Ban small mesh nets 4. Fish reserves 5. Fishing licenses 6. Other	1. Yes 2. Don't know 3. No money 4. Never 5. Other	1. For fish guards 2. For headman 3. For conservancy 4. For government 5. For people 6. Don't know 7. Other	1. Yes 2. Have seen it here 3. Have seen it at _____ 4. Have never seen it 5. Have not even heard of it 6. Other

RECREATIONAL FISHING ACTIVITY

Fill in one form for every trip. All fish, small or large, released or landed, must be recorded. Decide *before* trip if you are going to record catches!

Date: _____ Fishing started (time) _____ Fishing ended (time) _____

Number of rods _____ Group _____

Weather: _____ Water temp.: _____ Total km: _____

Name of Establishment: _____

	Species	Body length	Weight	Time caught	Location - where was the fish caught Name or GPS	Trolling, spinning, or worms	Released or landed	Comments
Example	Threespot	34.5 cm		17 hrs 45 min	Kalimbeza, Isl. View Lodge	Spinning	Released	Male
	1							
	2							
	3							
	4							
	5							
	6							
	7							
	8							
	9							
	10							
	11							
	12							
	13							
	14							
	15							
	16							
	17							
	18							
	19							
	20							
	21							
	22							

EXAMPLE OF WATER CHEMISTRY FORMS

Lake Liambezi Limnology Monitoring Data Sheet													
Date : DD / MM / YYYY							Record No.: _____						
Recorder Name : _____							Site : _____						
Habitat Type : _____				Wind Direction : _____			Cloud Cover : _____						
Temp (°C)	Conductivity (ms/cm)	pH	DO (mg/L)	Do%	Secchi depth (m)	Bottom Depth (m)	Samples collected	Tick	Comments				
							Phytoplankton						
							Nutrients						
							Zooplankton						
							Hardness & Alkalinity						
Habitat Type : _____				Wind Direction : _____			Cloud Cover : _____						
Temp (°C)	Conductivity (ms/cm)	pH	DO (mg/L)	Do%	Secchi depth (m)	Bottom Depth (m)	Samples collected	Tick	Comments				
							Phytoplankton						
							Nutrients						
							Zooplankton						
							Hardness & Alkalinity						
Habitat Type : _____				Wind Direction : _____			Cloud Cover : _____						

Temp (°C)	Conductivity (ms/cm)	pH	DO (mg/L)	Do%	Secchi depth (m)	Bottom Depth (m)	Samples collected	Tick	Comments			
							Phytoplankton					
							Nutrients					
							Zooplankton					
							Hardness & Alkalinity					
ANNEXURE:												
WIND DIRECTION CODES:												
N - Northerly (Winds from the North)						SE - South Easterly (winds from the South East)						
NE - North Easterly (winds from the North East)						SW - South Westerly (winds from the South West)						
NW - North Westerly (winds from the North West)						E - Easterly (winds from the East)						
S - Southerly (winds from the South)						W - Westerly (winds from the West)						
CLOUD COVER CODES:												
0 - Clear Sky (0 - 10 %)												
1 - Partly Cloudy (10 - 50%)												
2 - Overcast (50 - 100%)												
STANDARD OPERATION PROCEDURES (SOP)												
General and Weather data collection												
Nutrient sampling and Preservation												
Zooplankton sampling and Preservation												

Phytoplankton sampling and Preservation													